

For Four Cellos
(or other string instruments)

Xavier Shuang Xu
(b. 1988)

Introduction to the work

This piece is based on the diagram of energy bands of silicon (Fig. 1)¹.

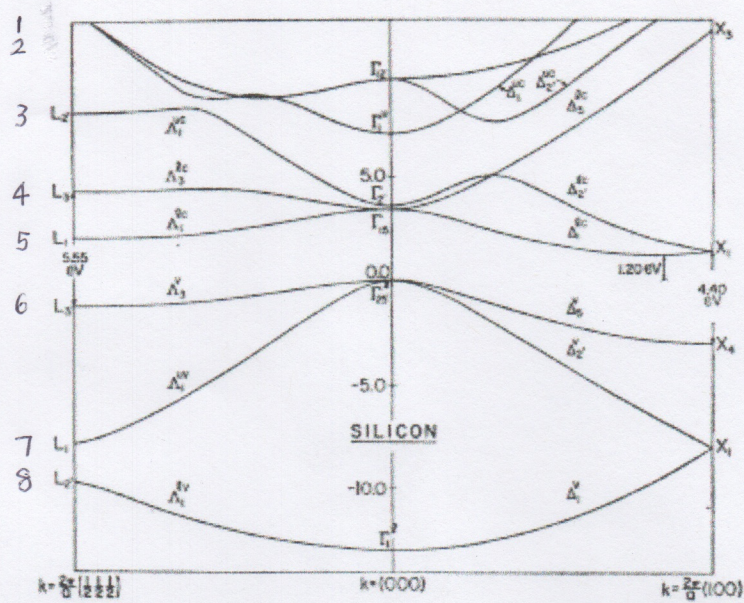


Fig. 1. Energy bands of silicon calculated by the $\mathbf{k}\cdot\mathbf{p}$ method
in the [111] and [100] directions of \mathbf{k} space.

There are eight bands, numbered 1-8 from top to bottom.

Four series are defined, each composed of numbers referring to the energy bands:

- 1: 1 2 3 4 5 6 7 8
- 2: 3 6 5 4 2 7 8 1
- 3: 6 3 4 5 7 2 1 8
- 4: 8 7 6 5 4 3 2 1

The piece is in four parts. In each part the musical parameters are determined by series in the scheme shown in the following table.

Part: ABCD	I	II	III	IV
Pitch	1234	2341	3412	4123
Dynamics	1432	1234	4123	2143
Bow position	2143	4123	1234	1432
Finger press	4123	3412	2341	1234

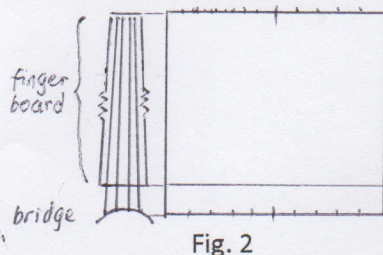
¹ Figure from *Phys. Rev.* 142 2 (1966), M. Cardona and F. H. Pollak.

Notes to the score

The piece is scored for four string instruments, preferably four cellos. Each plays solely on one string.

For four cellos, the stave correspondence is: I-C, II-G, III-D, IV-A. The same order applies to cases when same instruments are used, i.e. four basses, four violas or four violins. Namely, I-IV correspond to strings from low to high. For a typical string quartet, my arrangement is, I-Violin D, II-Violin G, III-Viola C, IV-Cello A. This is my original design, however, other combinations are allowed for performers to explore new sounds.

The clef is a geometrically shrunk string area of a real instrument, illustrate in Fig. 2.



Finger techniques

The position of finger is noted with black lines. The style of the line shows the finger pressure on the string.

Very slight touch,
as overtone playing



Medium pressure,
press half way to finger board

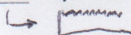


Solid press,
as normal



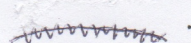
Fig. 3

The wave line on a stem represents trembling of finger pressure centering what the finger line indicates.




The general technique is moving the finger smoothly to produce *glissando*, however, some notes should be obtrusively stressed when a stem with tails appears. The tails tell the finger pressure that may be different from the context according to Fig. 3.

A special technique is fingernail scratch, noted by a saw line added to finger line, as This means using fingernail to press the string. Dynamics are defined as before.



Bow techniques

The position of bow is noted with red lines. The horizontal speed of the bow should be kept constant through the whole piece, except when a note needs to be stressed. Applied is the normal speed of playing a tone in moderate dynamic, about 5 seconds every up/down bow. Note that dynamic signs here are NOT of conventional meanings. Instead, they mark the pressure of the bow on the string (intensity, NOT the exact volume), with the scale from *ppp* (very slight contact) to *fff* (extremely heavy press).²

Tremblo is indicated by the sign  .

Other general concerns

Each box (as a measure) has a temporal length of 10 seconds, with assistant ticks of 1 second. No conductor is needed. However, I do suggest using a digital timer counting down in 10 seconds and automatically resetting to 10 when reaching 0. Put the timer in front of the quartet so that all performers will know where they are by seeing the counting numbers on the display. Try to be accurate.

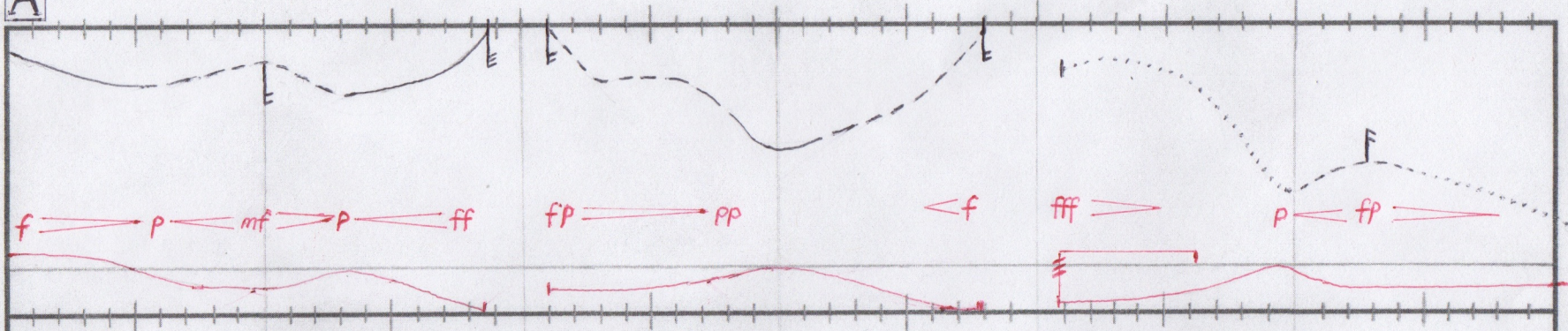
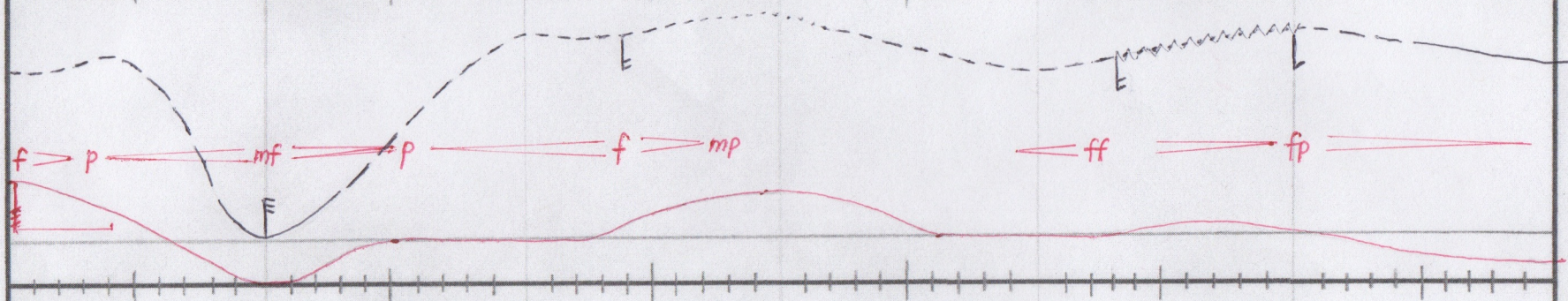
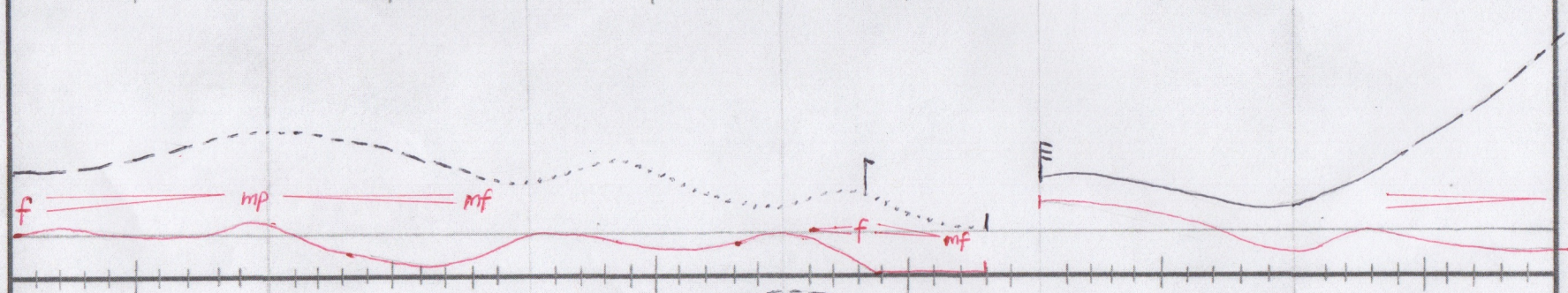
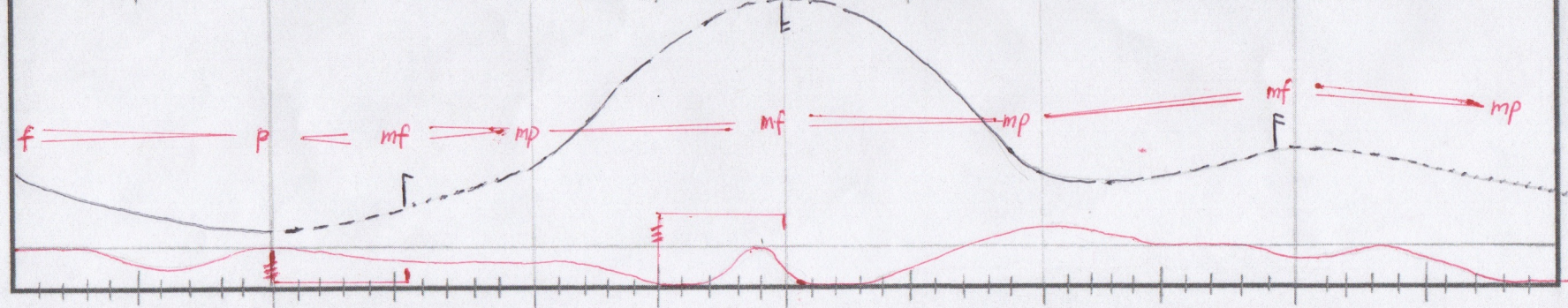
Starting points and stop points are marked by the little ticks on ends of both finger line and bow line. If the line passes the right border (the last bar line) of the stave on one page, it means the sound is going continuously over that page to the next page. DO NOT stop. Similarly, you will find the line going through the left border on the next page, which is also served as a reminder of continuity. If the line ends/begins right at the right/left border, it means a stop/start.

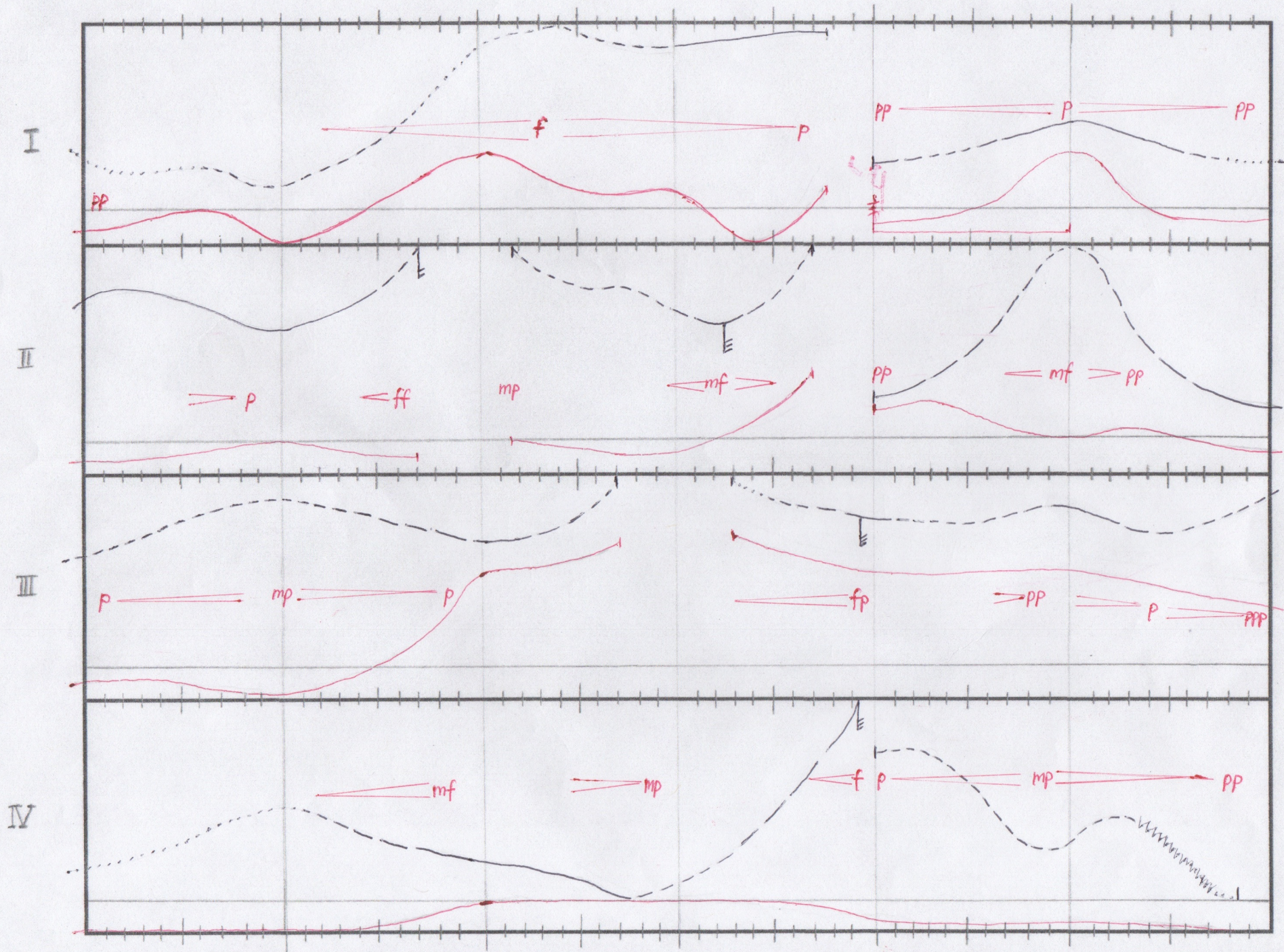
² Take an example to make a clearer elaboration: conventionally, we play a *forte* sound by increasing the bow pressure as well as the bow speed. Here, *forte* means only increasing the bow pressure. The bow speed is always fixed. Please note the difference.

Si I (2011)

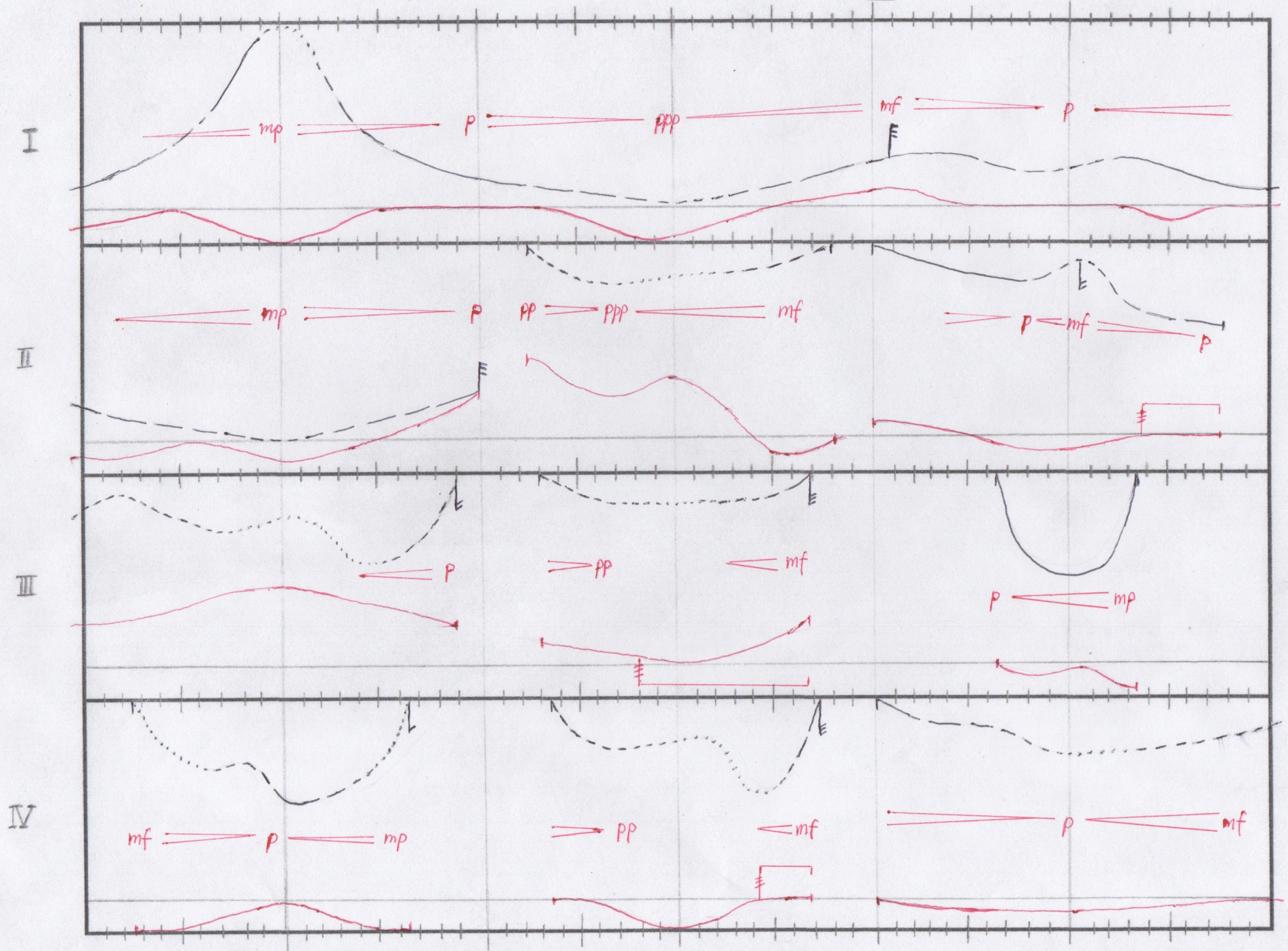
Xavier Shuang Xu
(b. 1988)

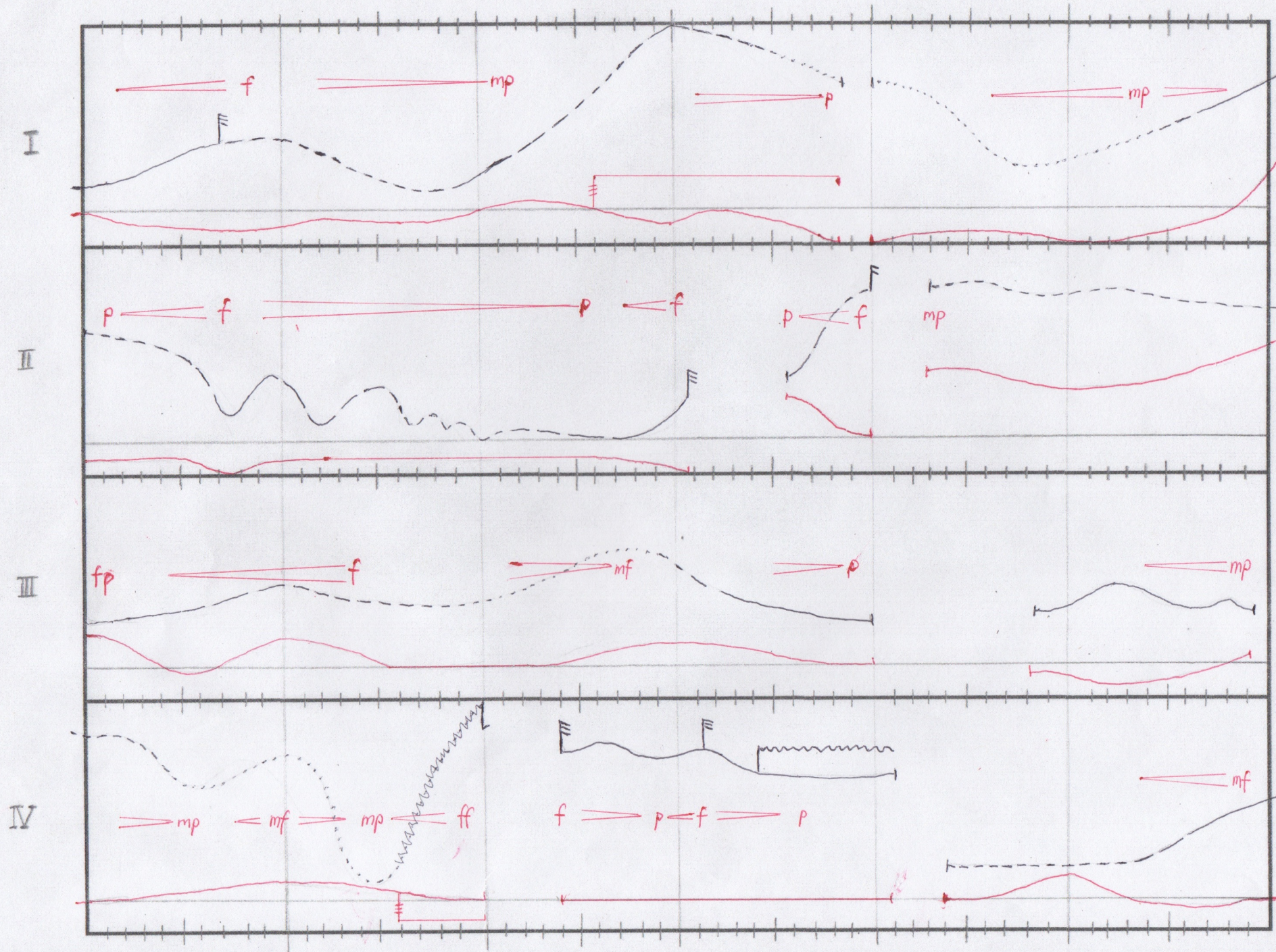
A

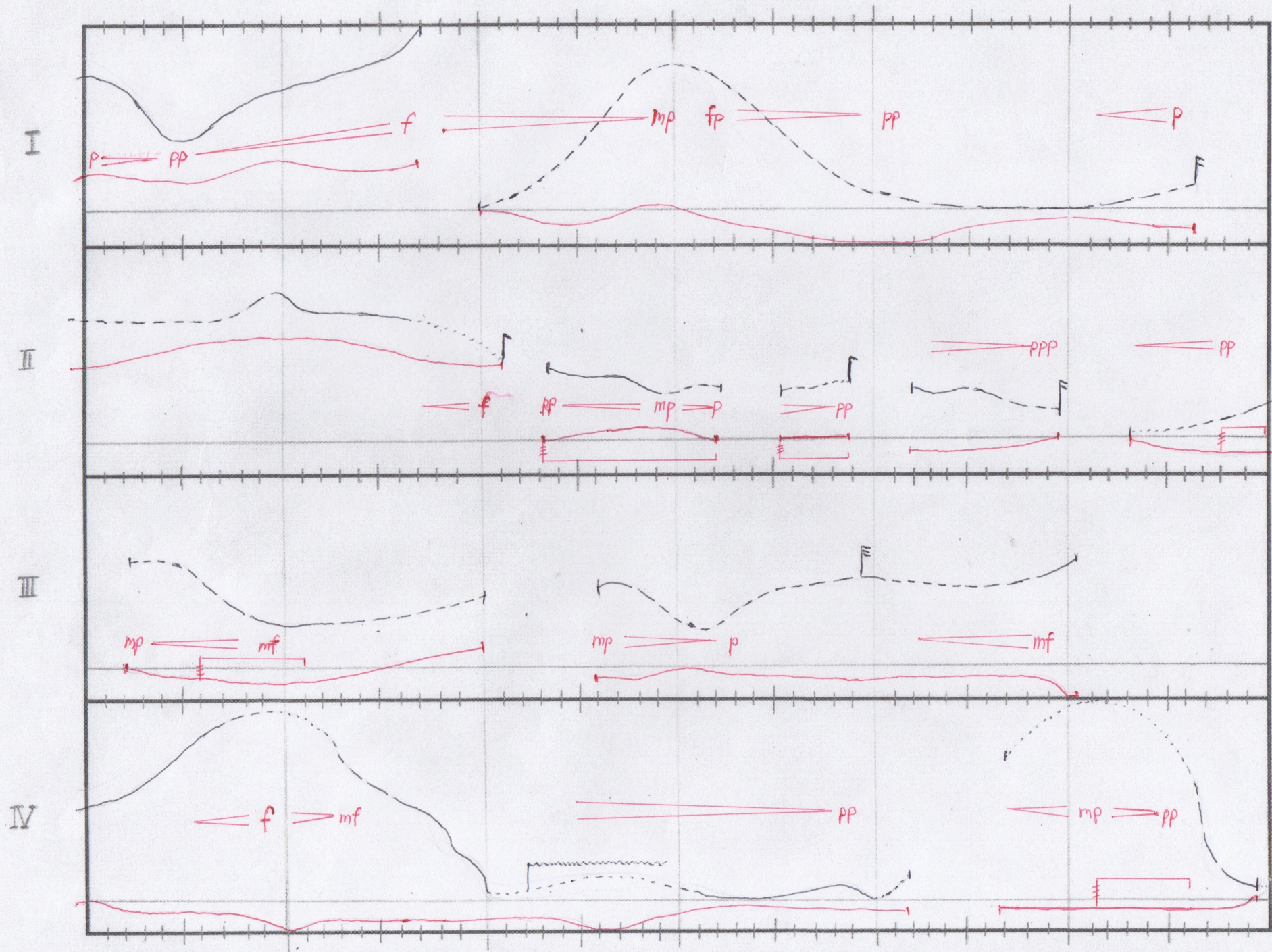
I
[Vc. on C]II
[Vc. on G]III
[Vc. on D]IV
[Vc. on A]



B







C

I

mf \rightarrow pp \rightarrow f \rightarrow mp

II

ppp

f

$p < f < p < f$

III

mf

f

p

ff

$> p$

mp

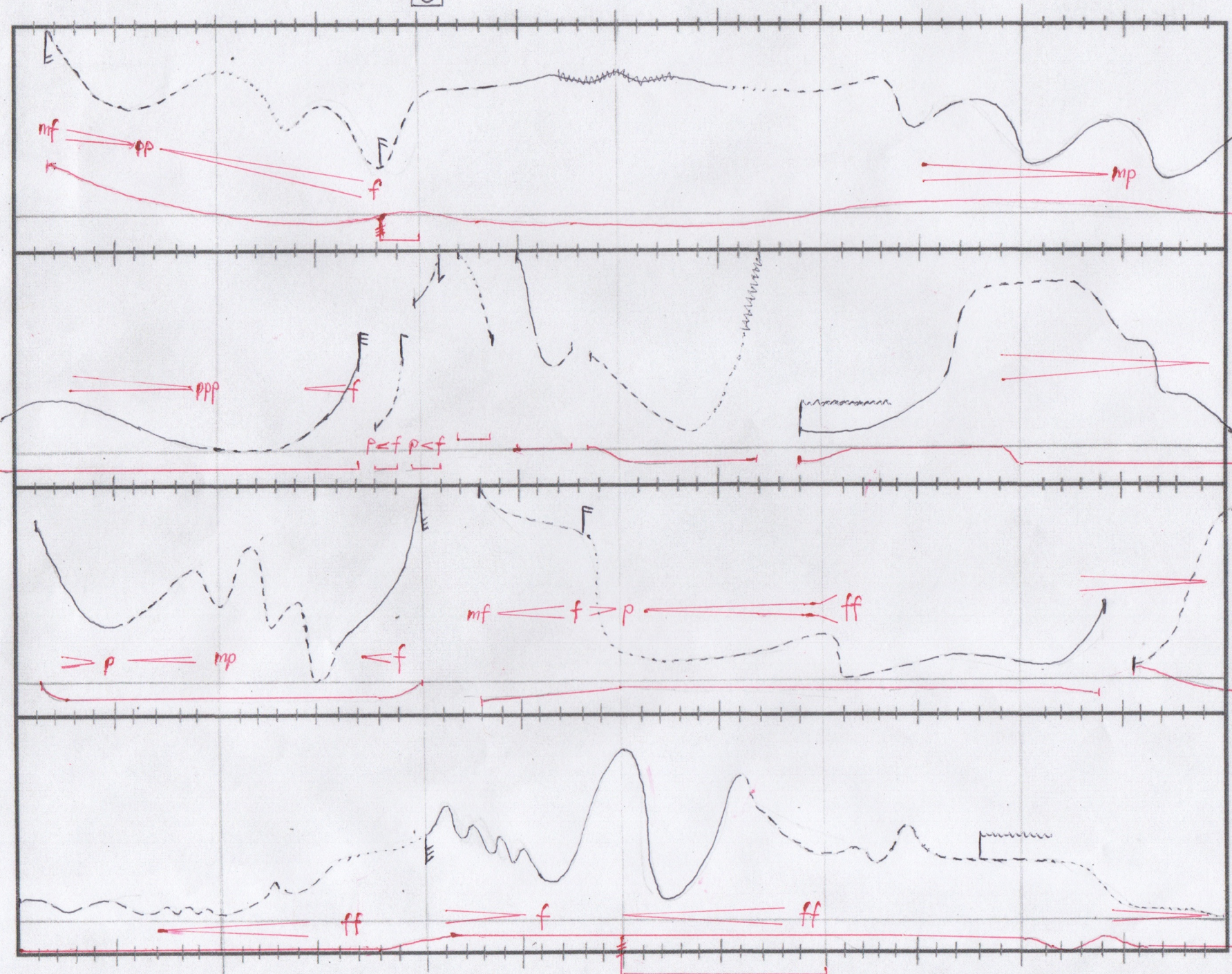
$< f$

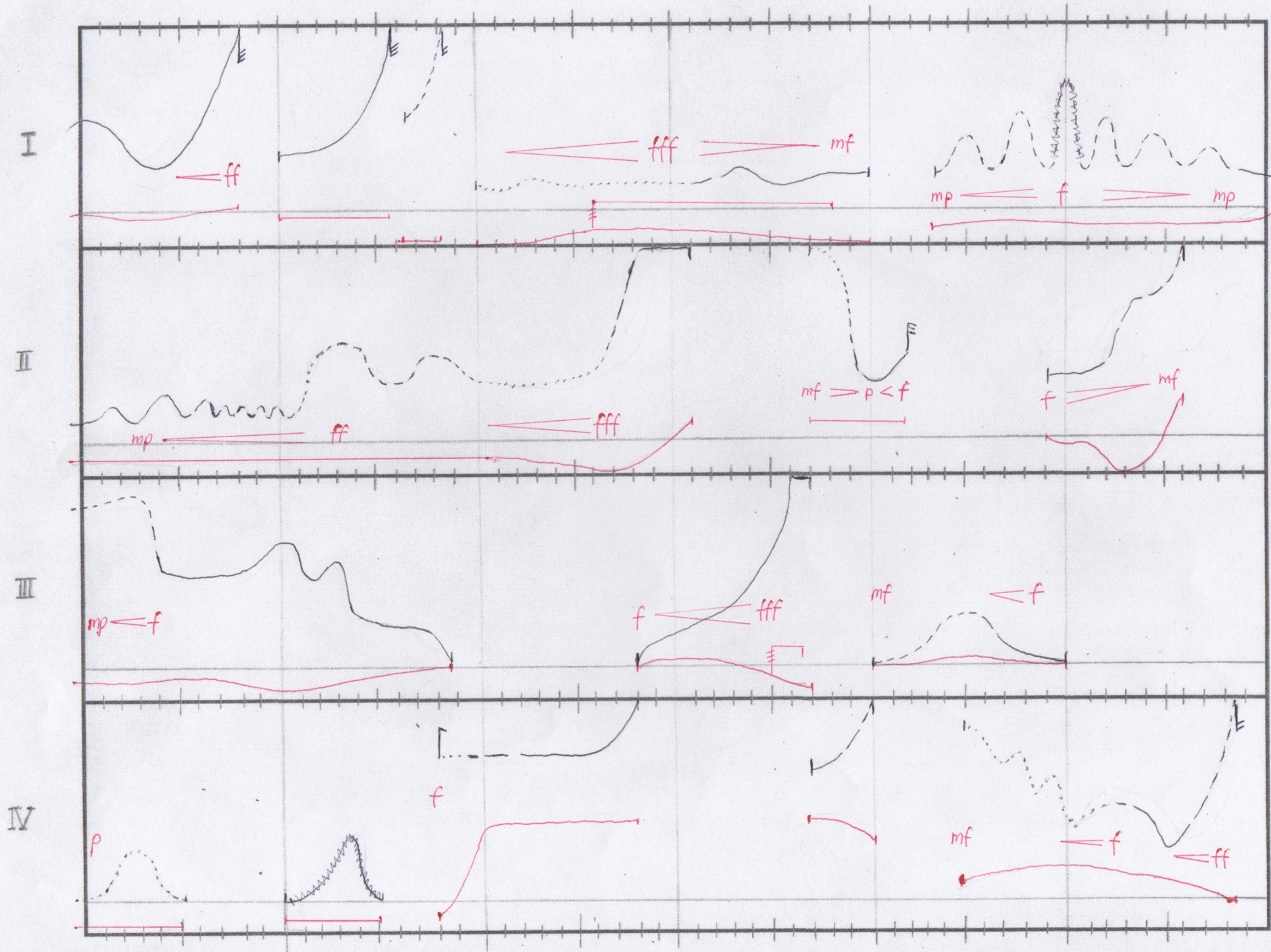
IV

ff

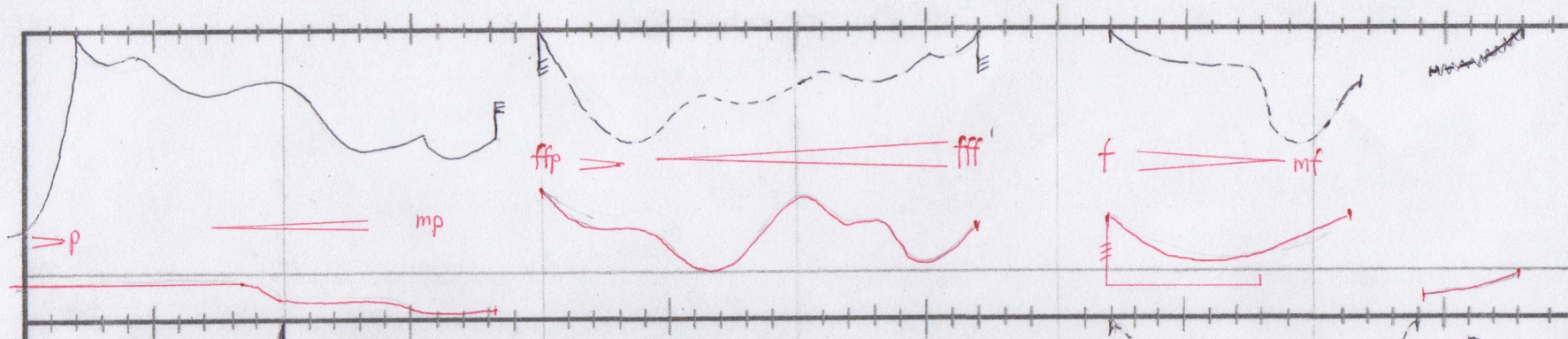
f

ff

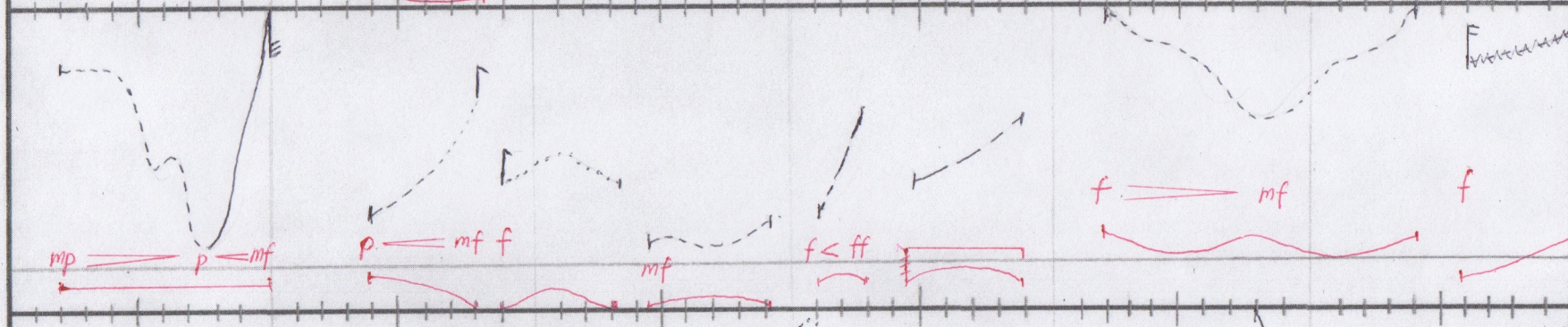




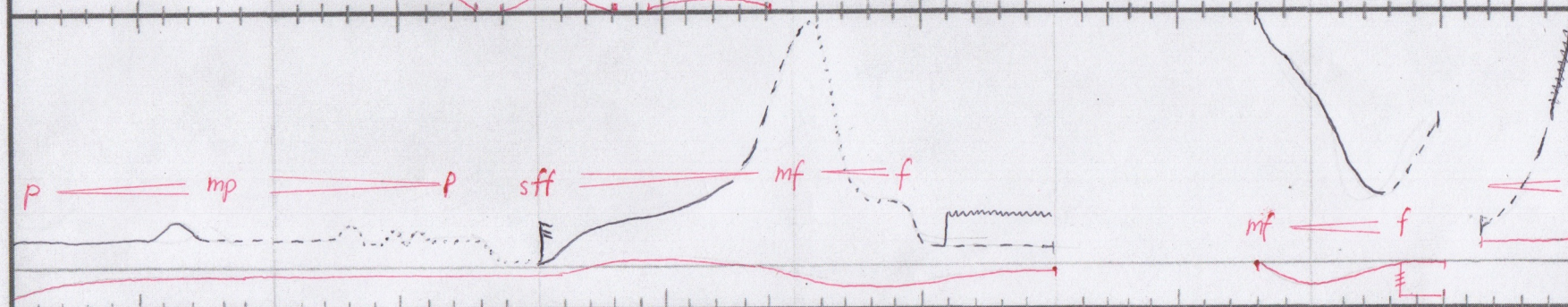
I



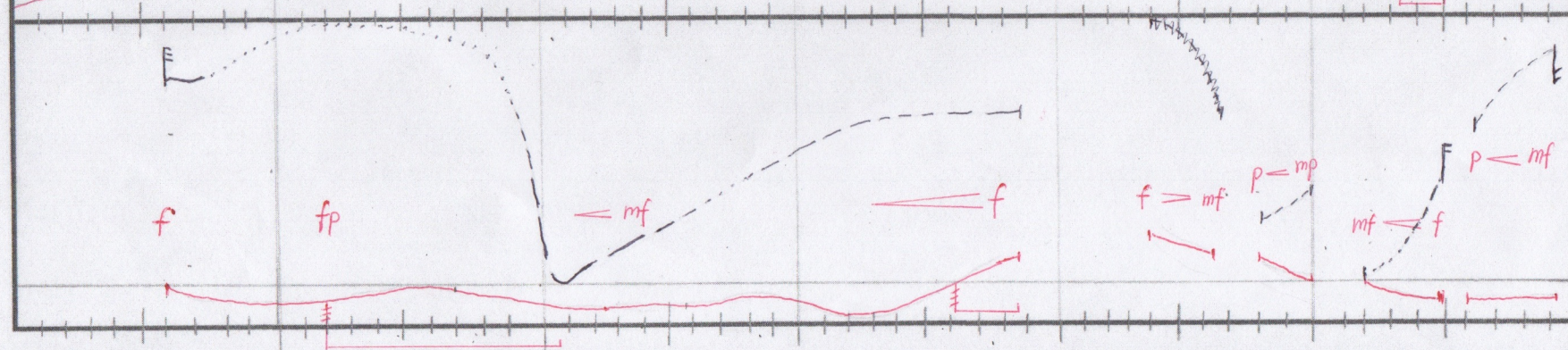
II



III



IV



D

I

$f < > mf$ $f < > mf$

f

p

mf

p

mp

II

$ff > f$

$p < mp$ p

f

p

mf

mp

III

f

mf

mp

p

mp

f

ff

IV

f

mf

mp

p

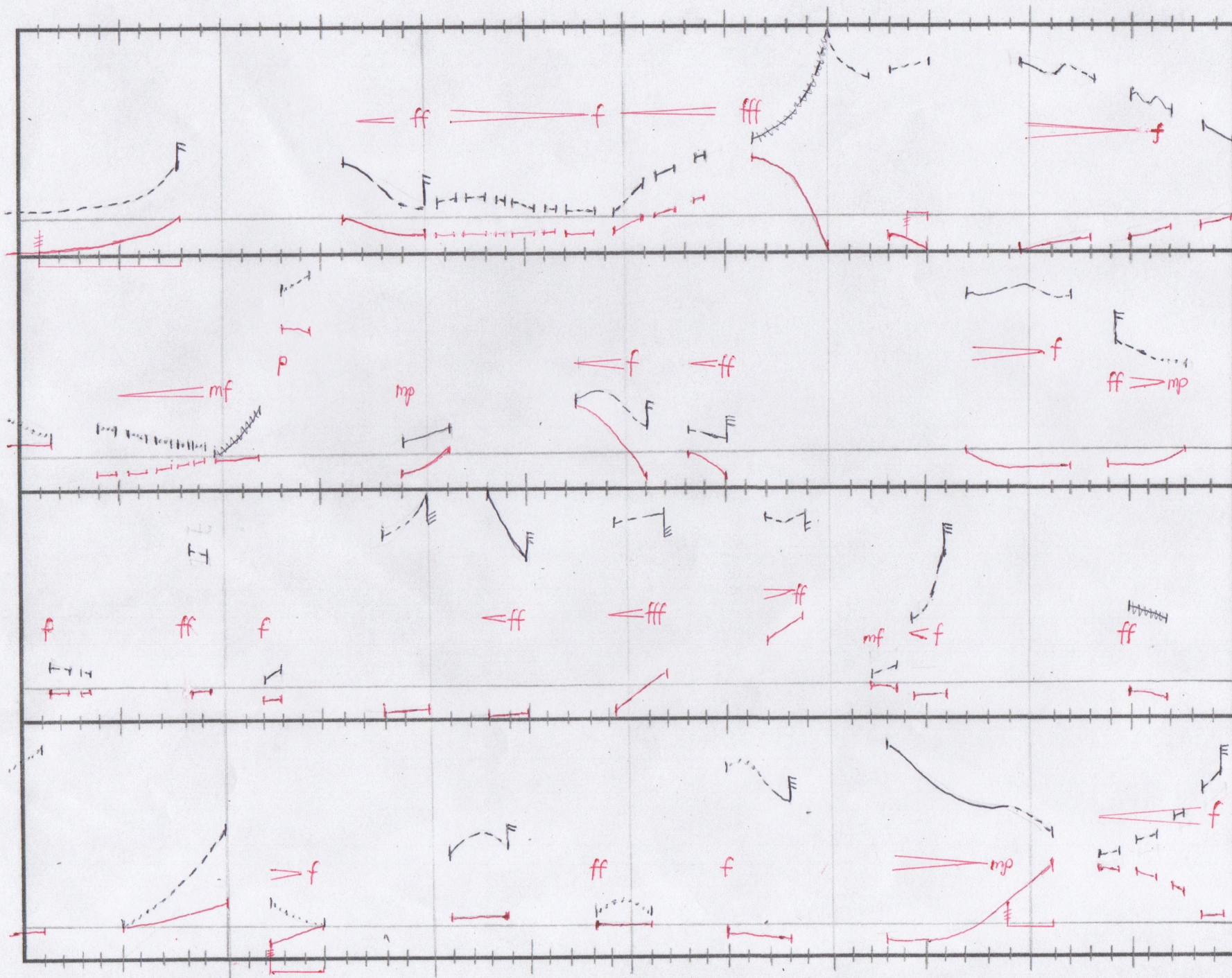
ff

I

II

III

IV



I

II

III

IV

The image shows a handwritten musical score on four staves, labeled I, II, III, and IV. The notation is in black ink with some red markings. The staves are divided into measures by vertical lines. Various musical symbols are used, including notes, rests, and articulations. Dynamics such as *p* (piano), *f* (forte), *mf* (mezzo-forte), and *ff* (fortissimo) are indicated. Articulations like *pizz.* (pizzicato) are also present. The score concludes with a boxed "FIN" at the end of each staff.

Staff I: Features a series of notes and rests. Dynamics include *ff* and *f*. A *pizz.* marking is visible near the end of the staff.

Staff II: Contains more complex notation with many notes and rests. Dynamics range from *p* to *ff*. A *pizz.* marking is also present.

Staff III: Shows a mix of notes and rests. Dynamics include *f*, *mf*, and *ff*. A *pizz.* marking is visible.

Staff IV: The final staff, featuring notes and rests. Dynamics include *p*, *f*, and *mf*. A *pizz.* marking is present near the end.